MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 3, 2017/2018

PMT0204 – FUNDAMENTAL MATHEMATICS II

(All sections / Groups)

04 JUNE 2018
9.00 a.m – 11.00 a.m
(2 Hours)

INSTRUCTIONS TO STUDENTS

1. This question paper consists of TWO (2) printed pages with 4 questions only.
2. Answer all FOUR (4) questions.
3. Write all your answers in the answer booklet provided.
4. Only NON-PROGRAMMABLE calculators are allowed.

Question 1 (25 Marks)

a) Solve the equation $4\begin{bmatrix} x \\ y \end{bmatrix} - 4(3 \quad 4)^T = 5\begin{bmatrix} 20 \\ -16 \end{bmatrix}$. **(5 marks)**

b) Given $A = \begin{bmatrix} 1 & -2 \\ 0 & 3 \end{bmatrix}$ $B = \begin{bmatrix} -2 & 3 & 0 \\ 1 & -4 & 1 \end{bmatrix}$ $C = \begin{bmatrix} -1 & 1 \\ 0 & 3 \\ 2 & 4 \end{bmatrix}$, find

i) $3A - 2BC$. **(6 marks)**

ii) $A(BC)$. **(4 marks)**

c) Solve the following system of equation using the Inverse Method.

$$x + y - z = 7$$
$$2x - 3y - 2z = 4$$
$$x - y - 5z = 23$$

(10 marks)

Question 2 (25 Marks)

a) Verify the identity $4sec^2\theta = \frac{2}{1-\sin\theta} + \frac{2}{1+\sin\theta}$. **(4 marks)**

b) Find all solutions of $sec^2x - 3\sec x + 2 = 0$ in the interval of $[0,2\pi)$.

(9 marks)

c) Given a triangle with sides, $a = 2$, $b = 7$ and $c = 8$. Find the angle A, B and C. **(8 marks)**

d) Express the complex number of $5 + 2i$ in polar form. **(4 marks)**

Continued...

Question 3 (25 Marks)

a) Evaluate the following limits:

i) $\lim_{x\to 1} \frac{x^2-6x+5}{x-1}$ **(3 marks)**

ii) $\lim_{x\to -2} \frac{1}{(x+2)^2}$ **(3 marks)**

iii) $\lim_{x\to +\infty} \frac{2x^3-4x^2+2}{3x^3-2}$ **(4 marks)**

b) Differentiate and simplify the following functions:

i. $f(x) = \frac{(3x+1)^3}{x+2} + e^{2x+3} - \ln(5x^3 - 2)$ **(6 marks)**

ii. $f(x) = \csc x \cot x$ **(5 marks)**

c) Identify the intervals where the function $f(x) = -2x^2 + 4x + 3$ is increasing or decreasing. **(4 marks)**

Question 4 (25 Marks)

a) Integrate the following functions:

i. $\int \frac{2x}{\sqrt{9-4x^2}} dx$ **(6 marks)**

ii. $y = \int_0^1 x^2 e^x dx$ **(10 marks)**

b) Find the areas of the region enclosed by the curve $y = x^2 - 2x$ and the line $y = x$. Sketch the region. **(9 marks)**

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